

PRIOR ART PATTERN MATCHING

FIG. 1

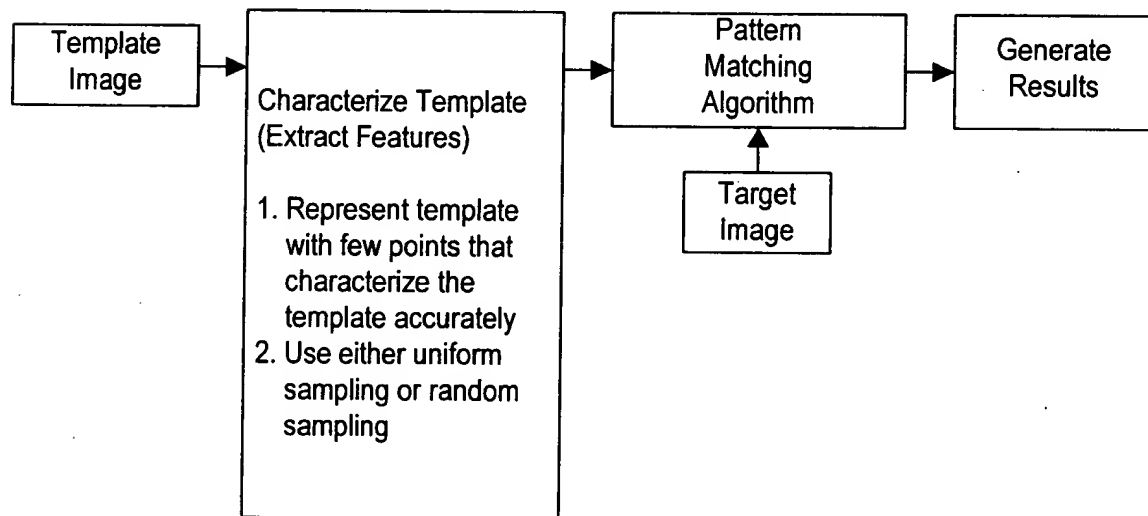
PRIOR ART PATTERN MATCHING WITH
CHARACTERIZATION OF THE TEMPLATE IMAGE

FIG. 2

09638271.081400

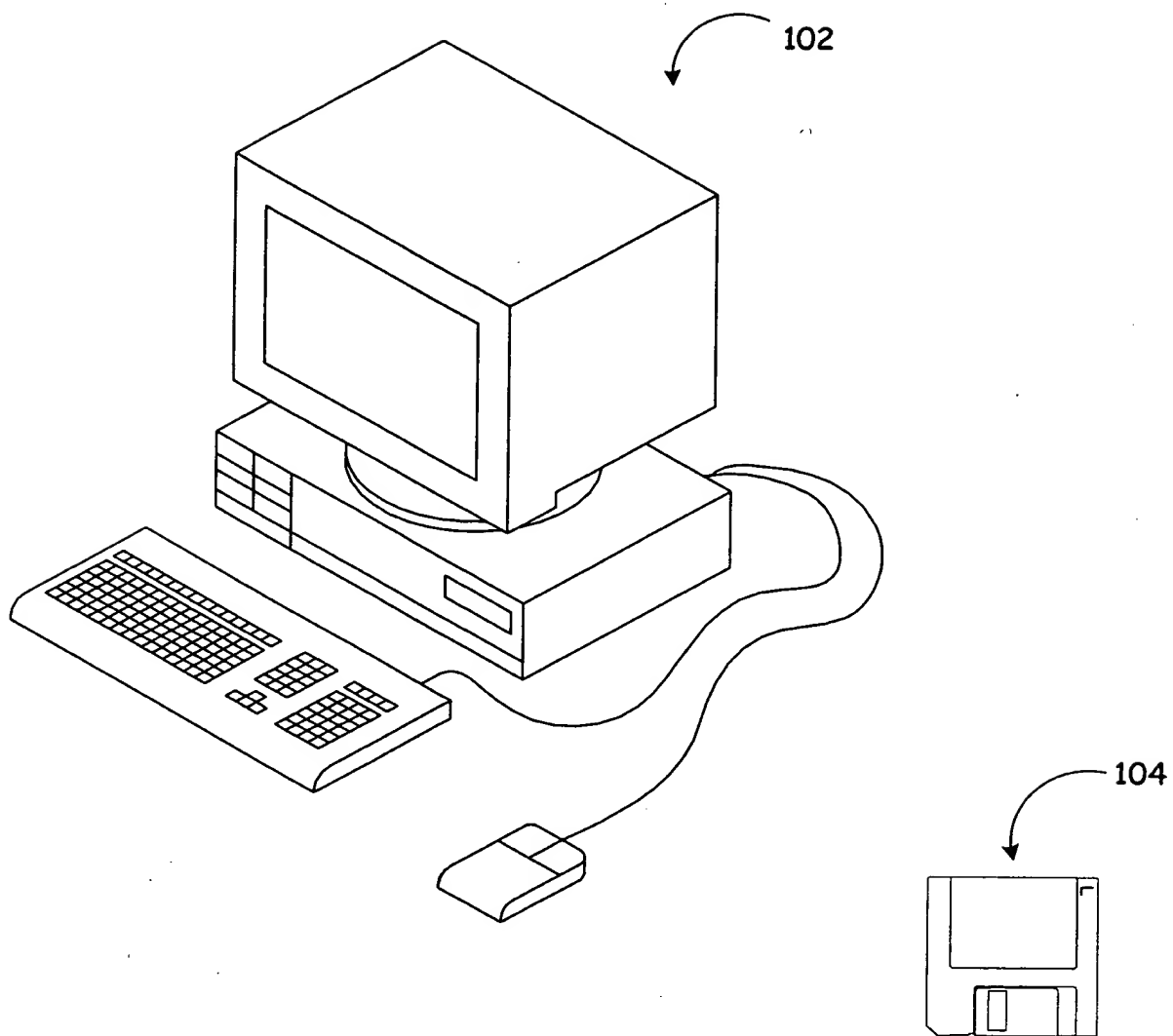


FIG. 3

09087-09140

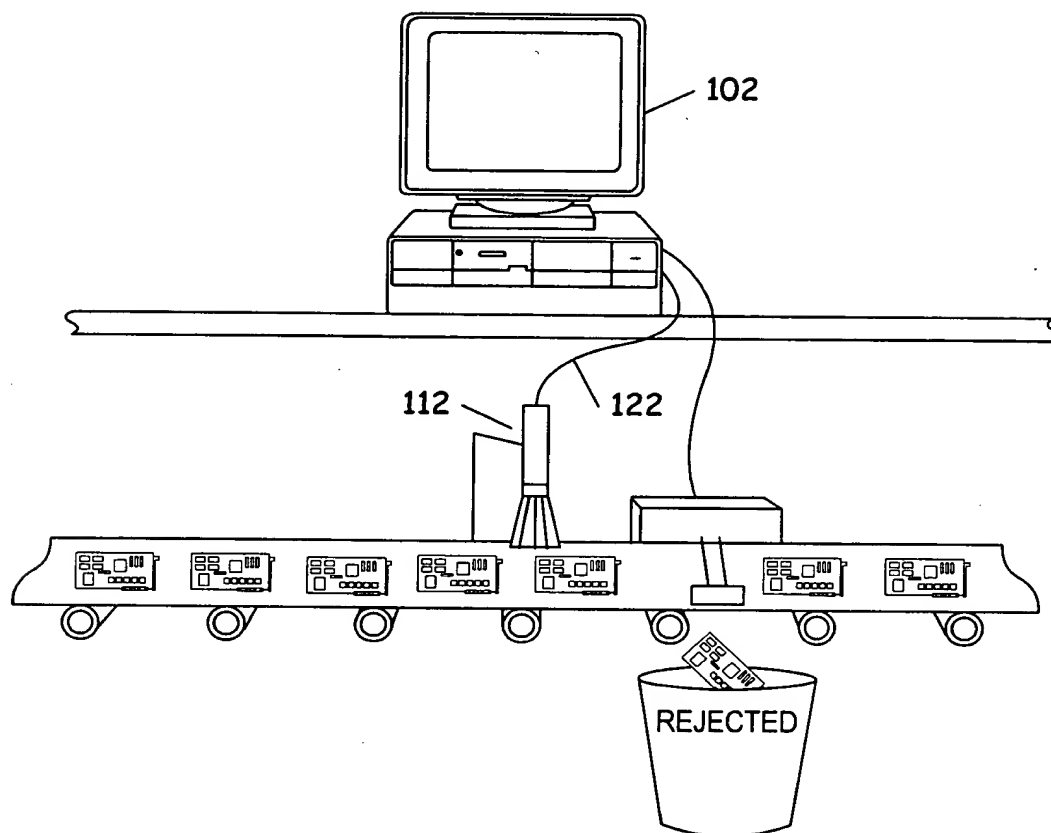


FIG. 4

09638271.081420

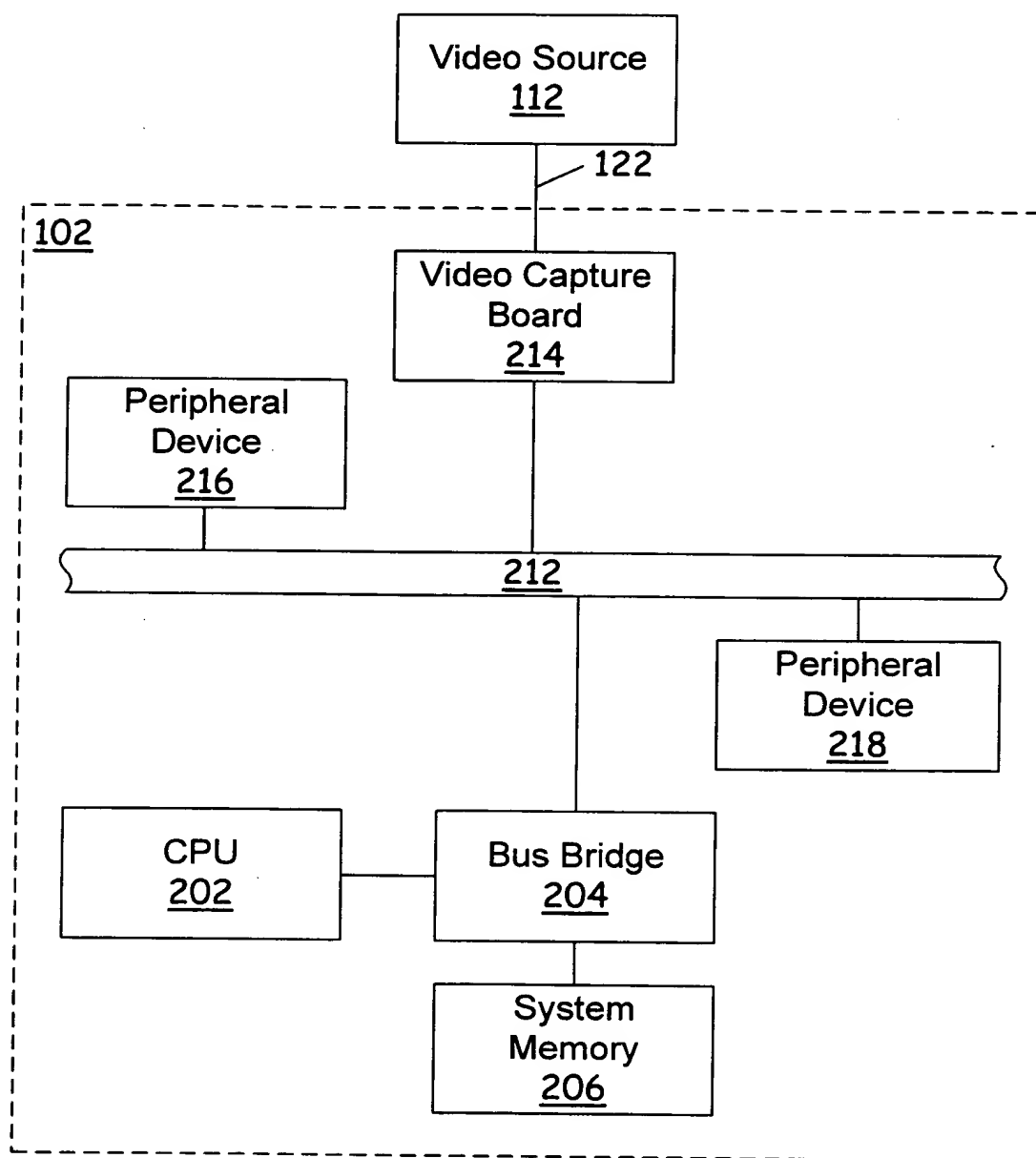


FIG. 5

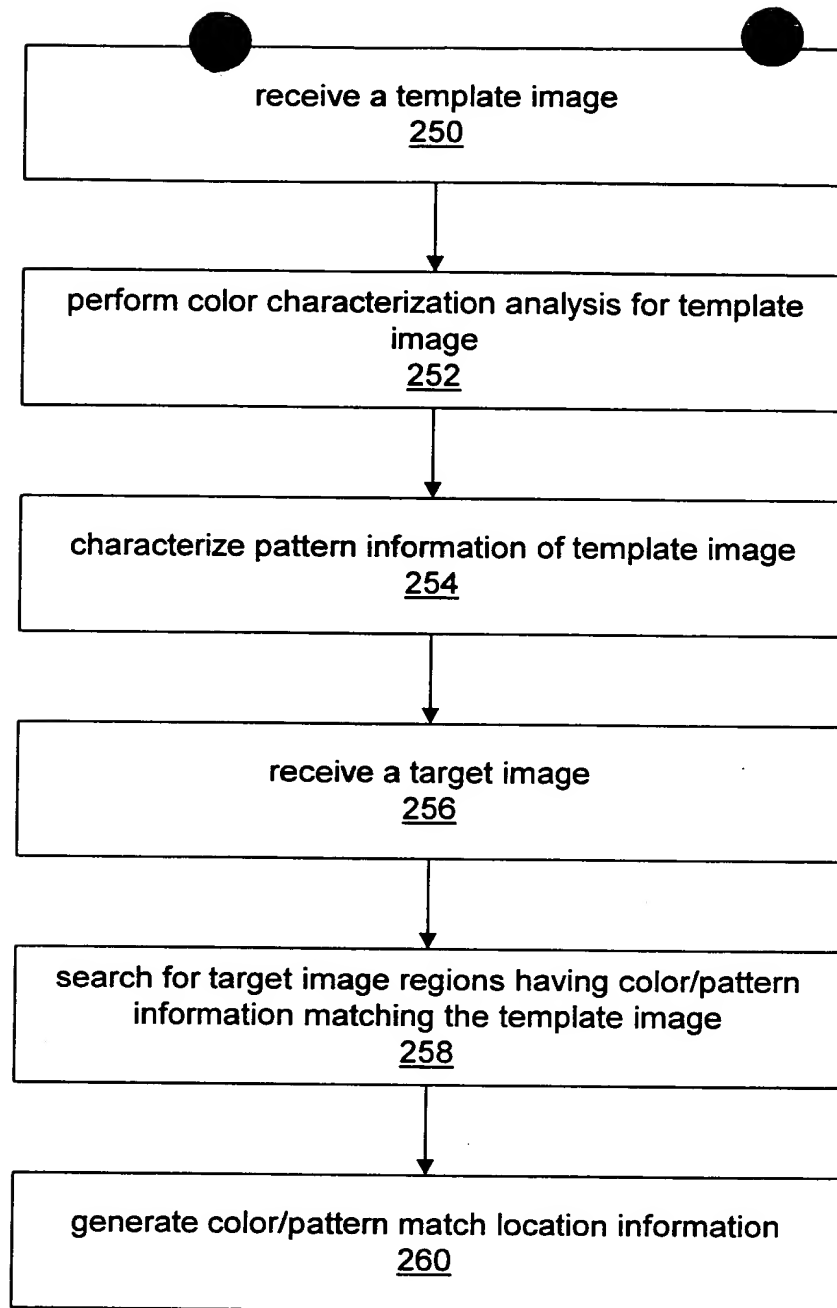


Figure 6

09638271.0814.00

09638271-081400

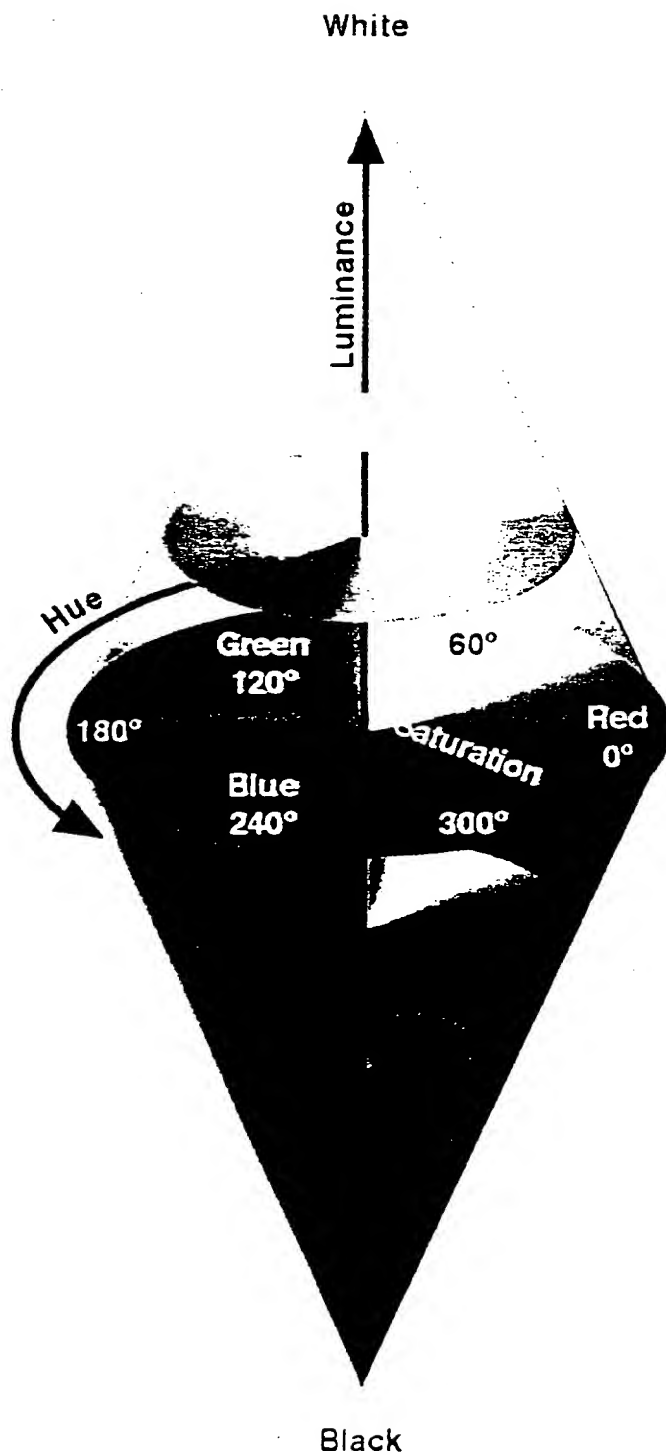


FIG. 4⁷ (need color print)

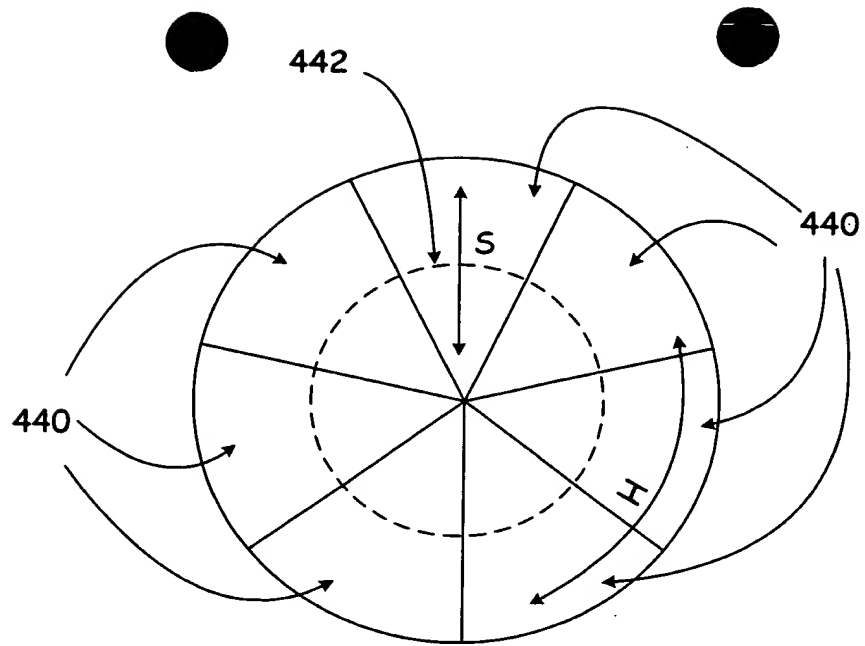


FIG. 8A

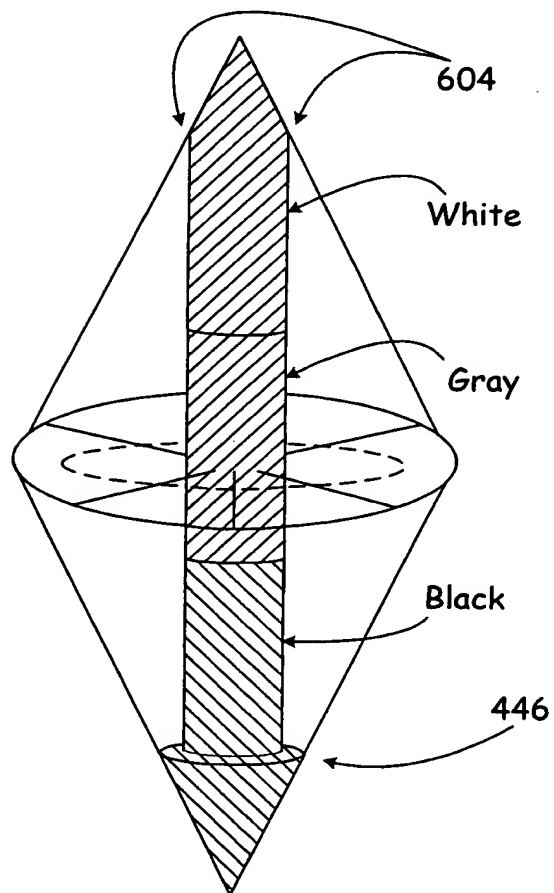


FIG. 8B

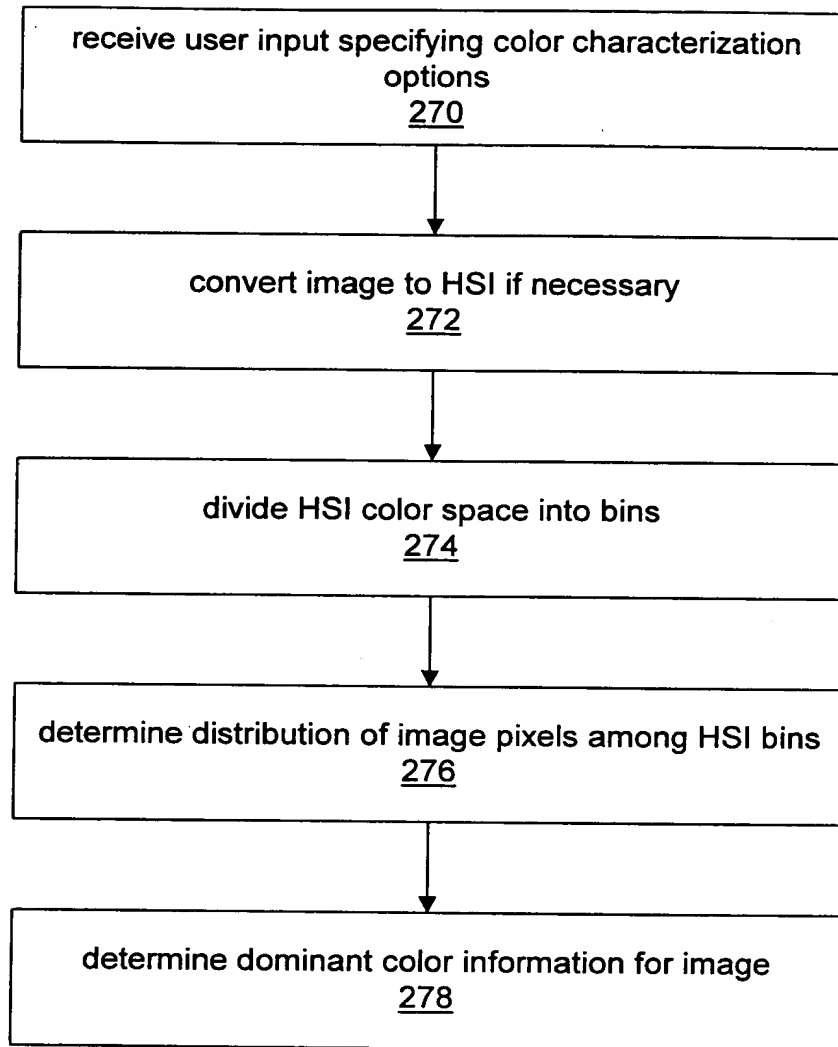


Figure 9

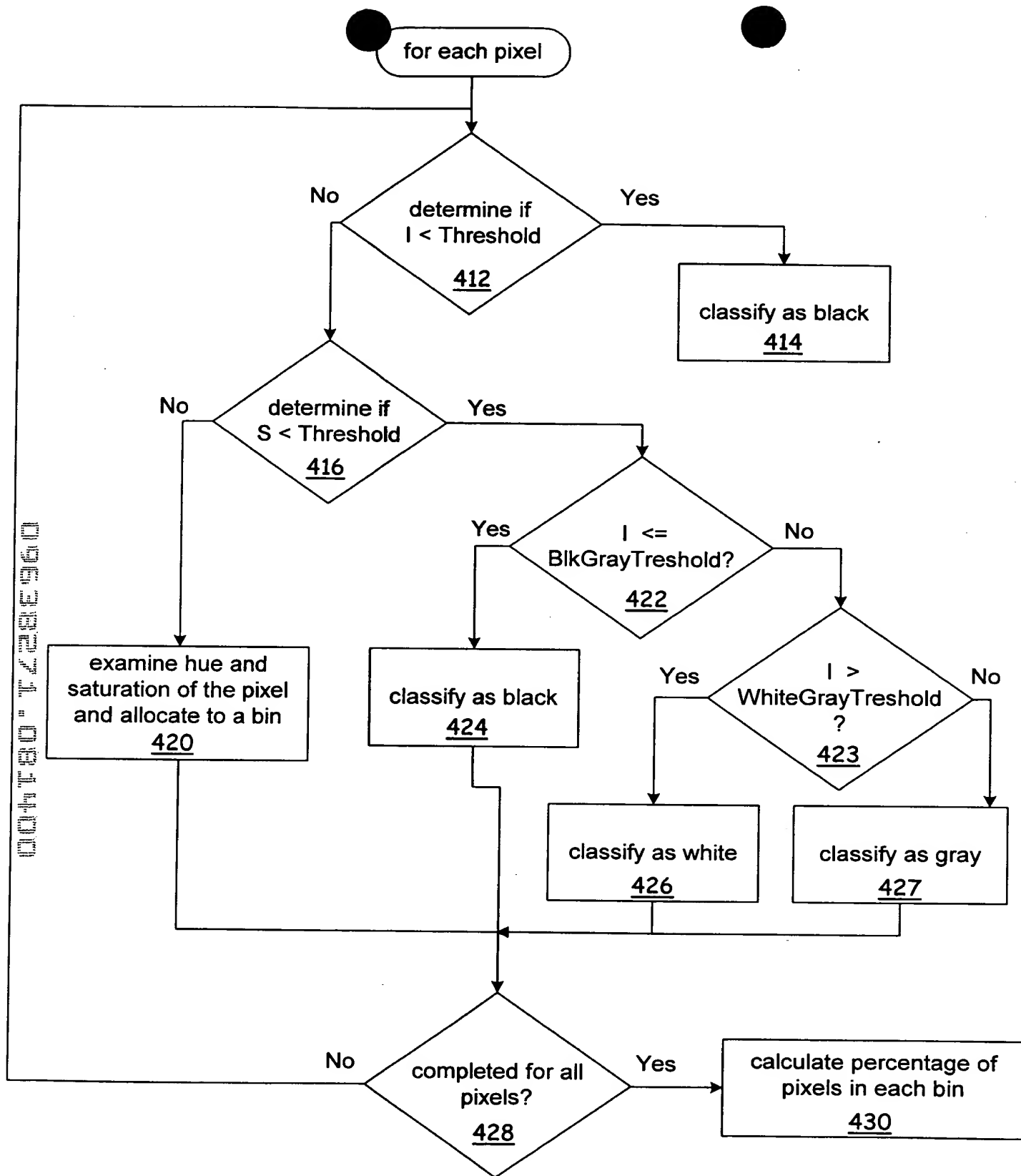


FIG. 10

Step 254

sample the template image to produce a plurality of
sample pixels
300

perform a local stability analysis for each of the plurality
of sample pixels
302

store the sample pixel values which have a requisite
stability within a pre-defined neighborhood
304

detect subsets of sample pixel values with varying
stability regions; compute step sizes
306

Figure 11

00638271.081400
004180" 7288960

Step 258

receive user input specifying search options
450

perform a first-pass search through the target image
based on color information to find initial color match
candidate regions
452

for each color match candidate region, perform a search
through a region surrounding the region based on
pattern information
454

generate final list of color & pattern match regions
456

Figure 12

9 x 9 Pixel Step Size

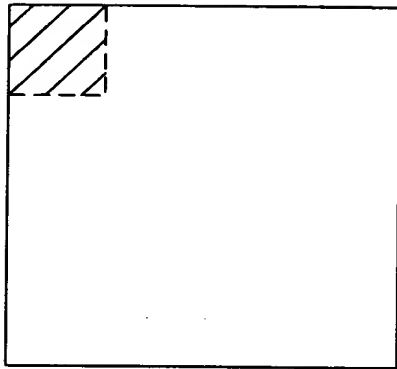


FIG. 13a

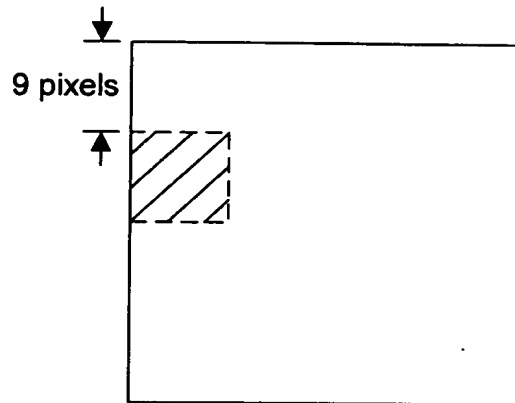


FIG. 13b

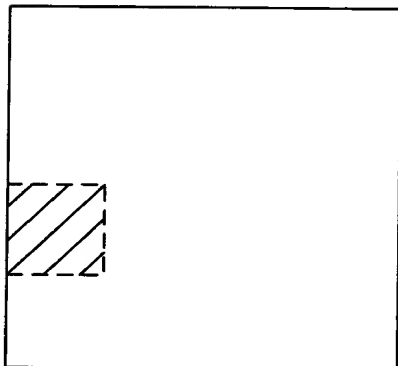


FIG. 13c

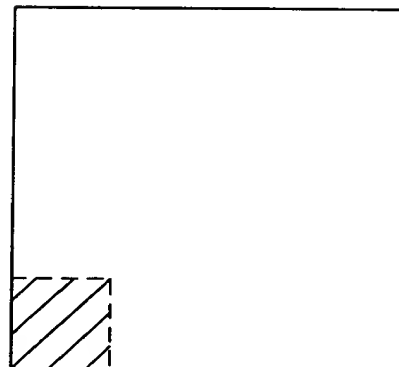


FIG. 13d

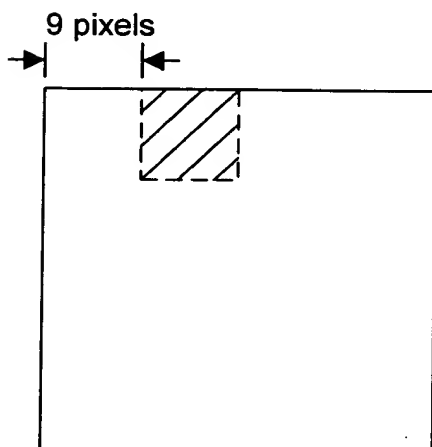


FIG. 13e

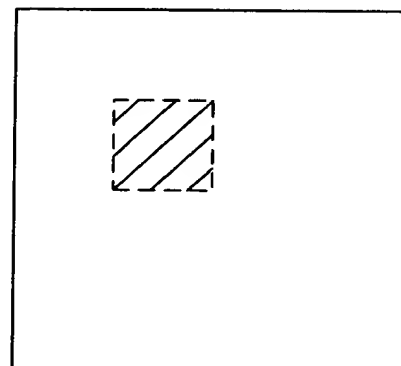


FIG. 13f

004780" 1 228E960

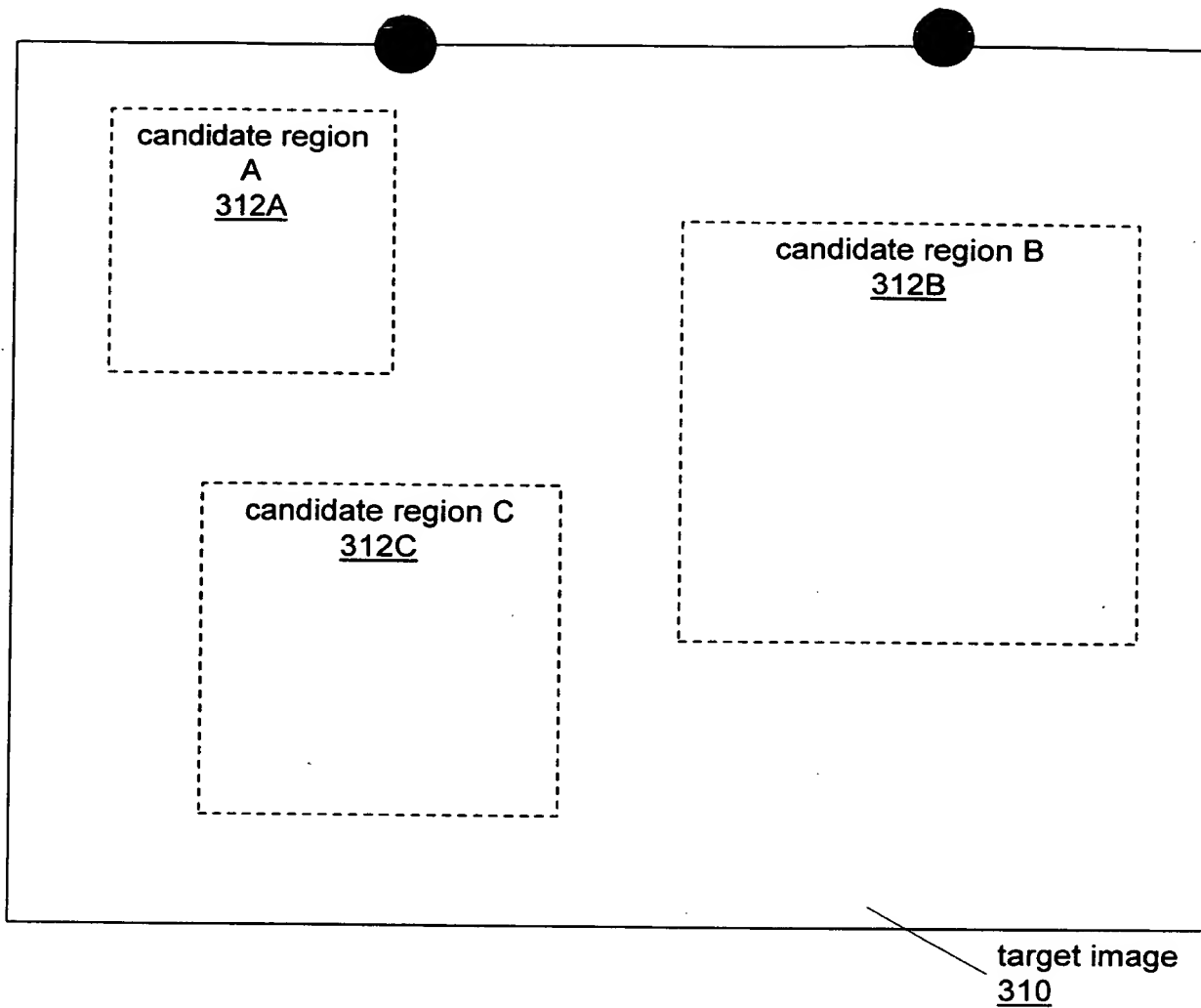


Figure 14

09638271-081400

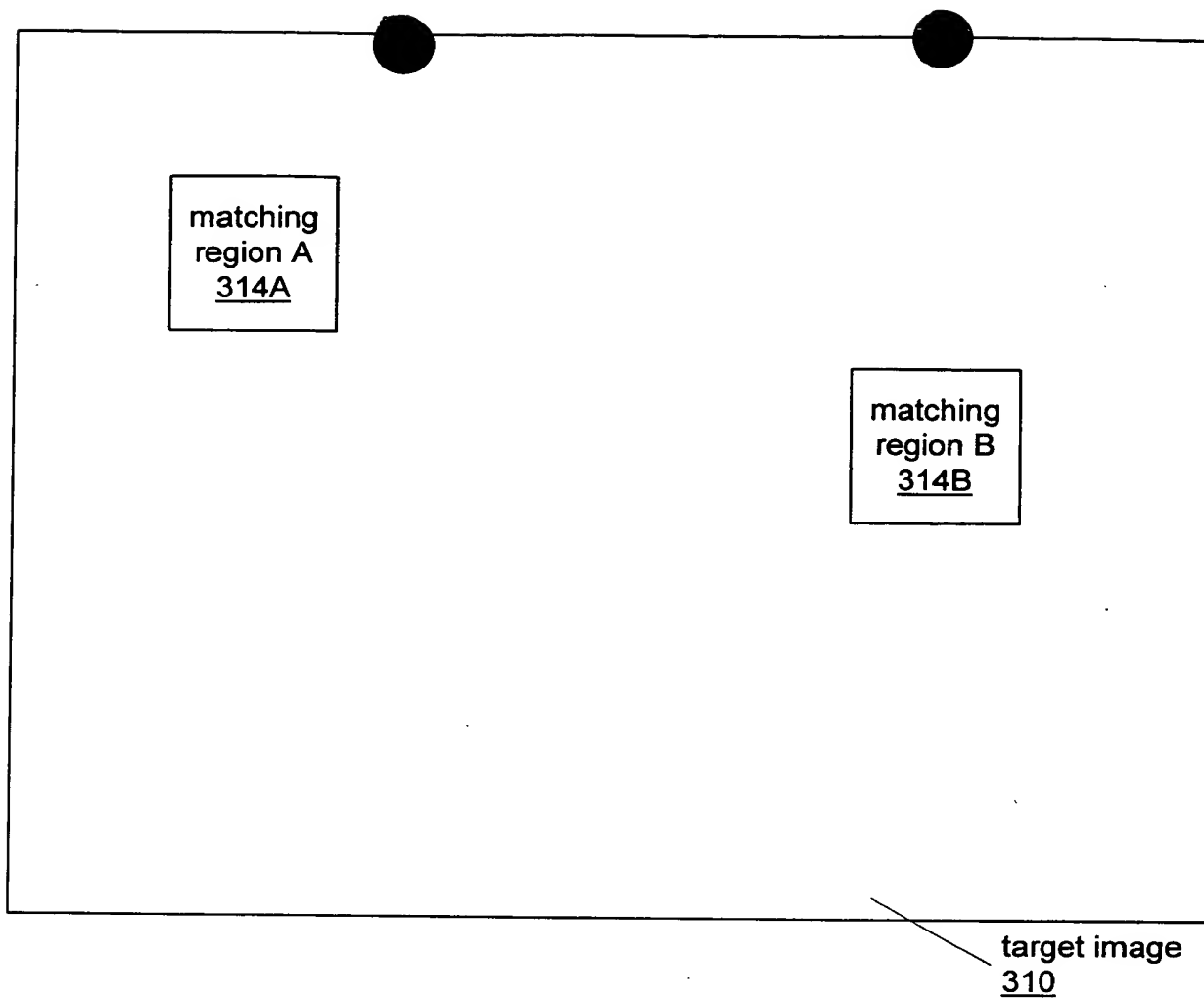


Figure 15

Step 452

determine search step size
470

determine sub-sampling size and type
472

for each sample region:

perform color characterization analysis for region
474

compute color spectrum difference between region and
template image
476

compute dominant color difference between region and
template image
478

add region to candidate list of color match regions if
color spectrum and dominant color differences are
sufficiently small
480

Figure 16

004T20" T228E960

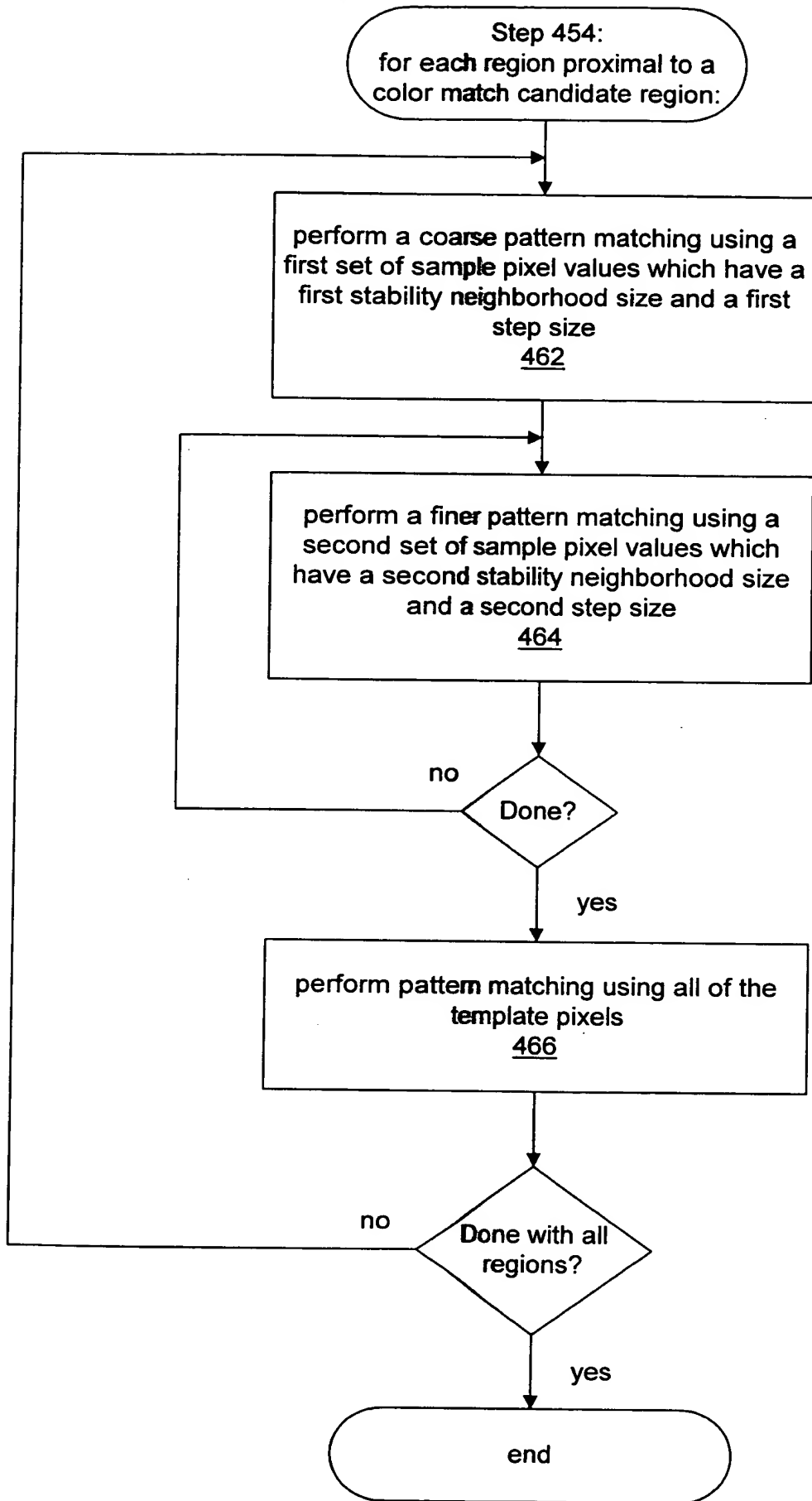


Figure 17

5 x 5 Pixel Step Size

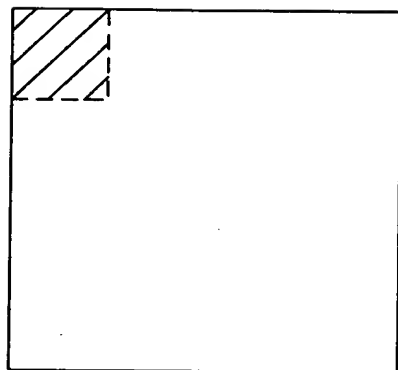


FIG. 18a

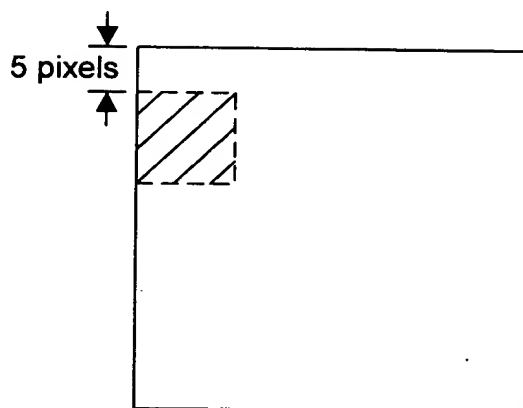


FIG. 18b

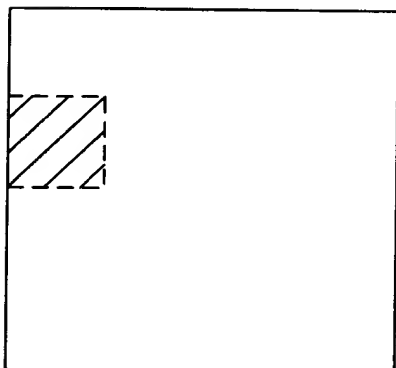


FIG. 18c

...

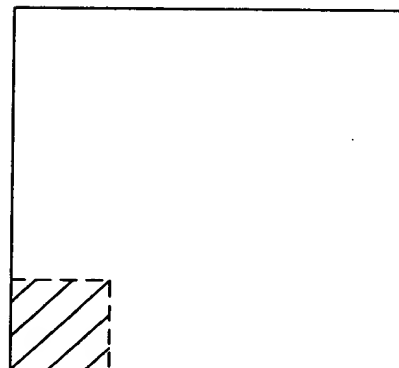


FIG. 18d

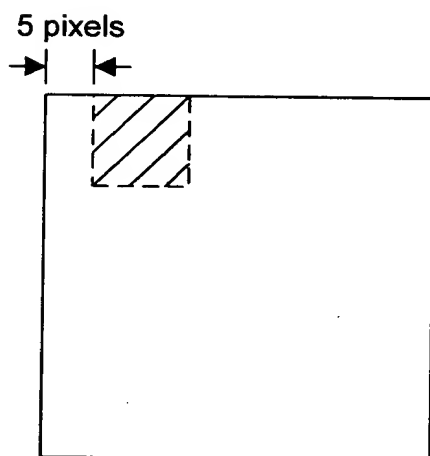


FIG. 18e

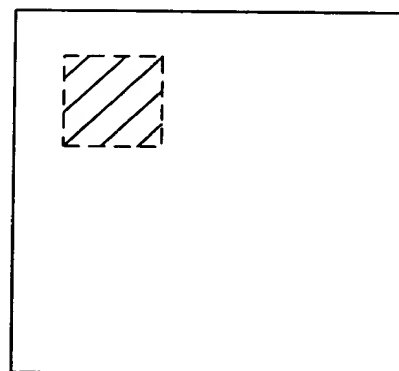


FIG. 18f

09638271.081400

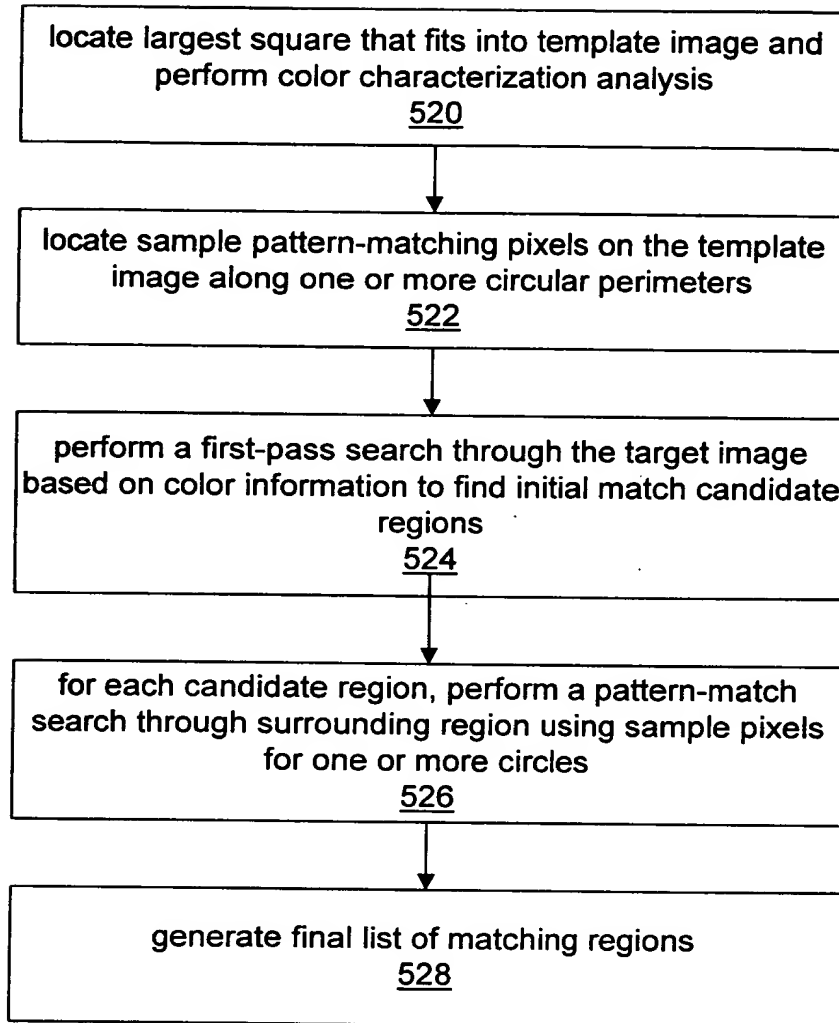


Figure 19

004780" T28E360

locate largest square that fits into template image and perform color characterization analysis
540

locate sample pattern-matching pixels on the template image along one or more circular perimeters
542

perform local stability analysis on each circular point for each circle to determine spatial perturbations
544

select most stable circle for initial search process
546

perform a first-pass search through the target image based on color information to find candidate color match regions
548

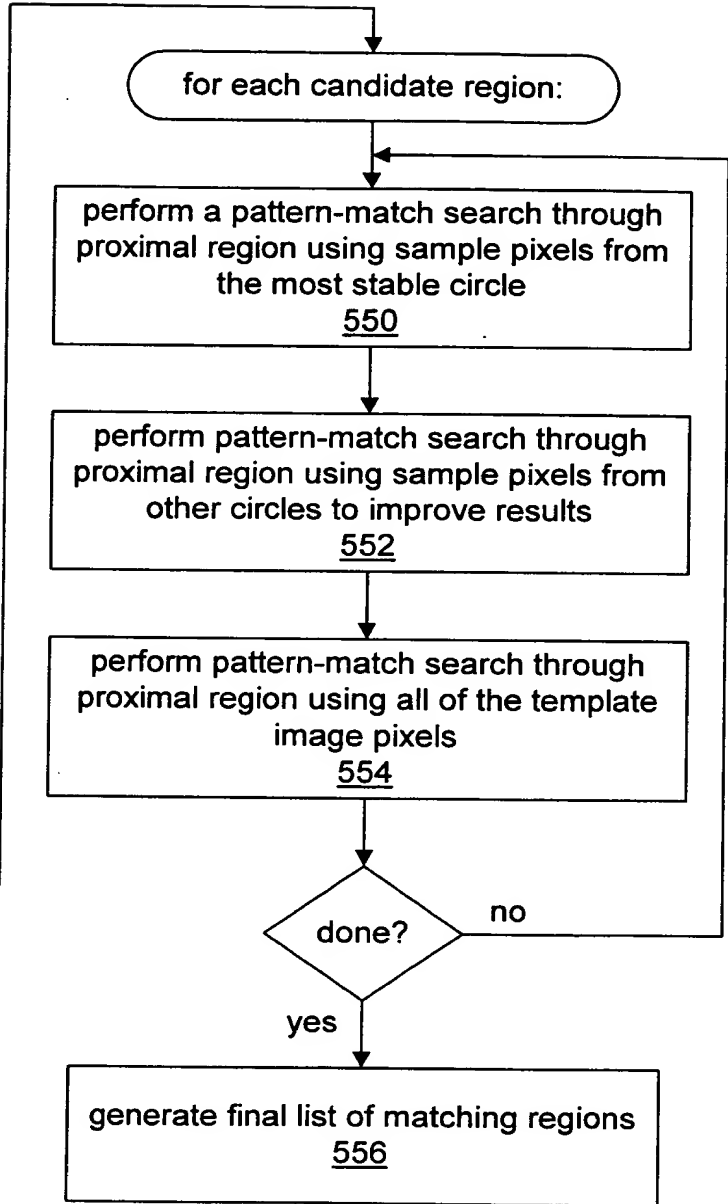


Figure 20

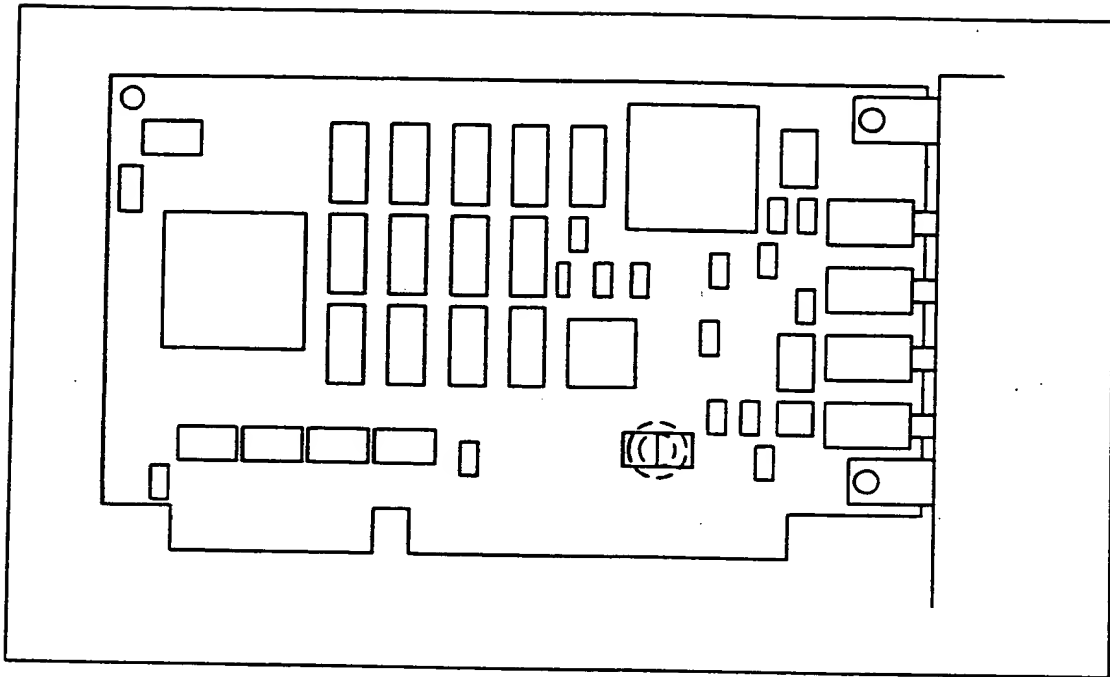


FIG. 14A
21

Template

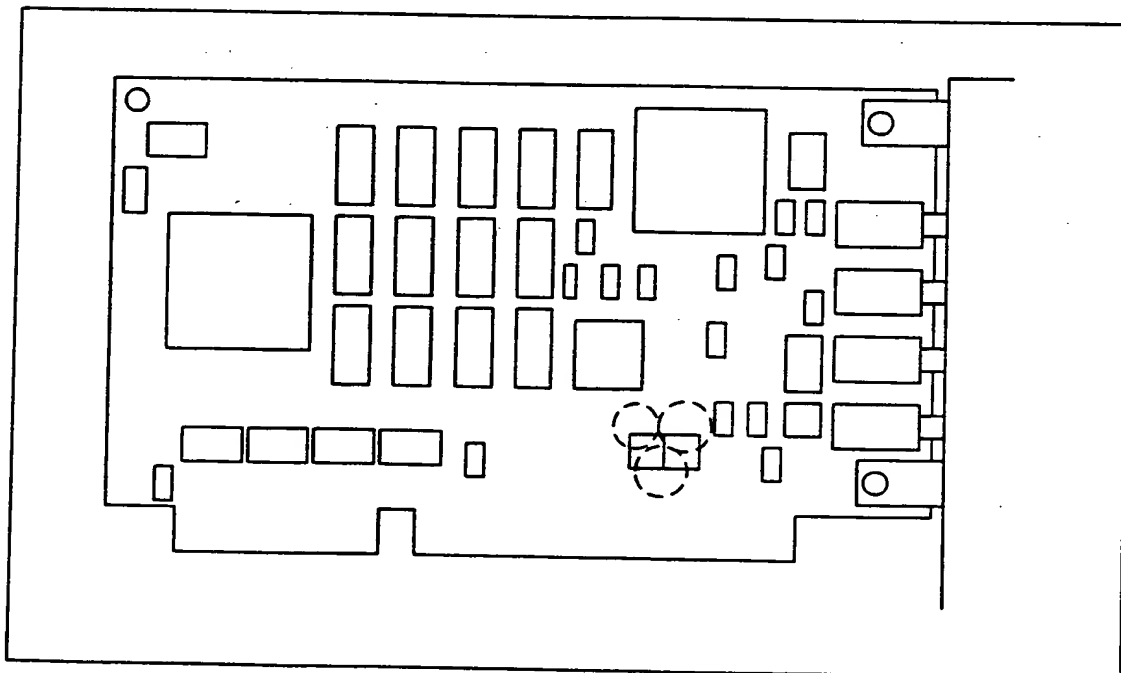


FIG. 14B
21

004T80-T28E960

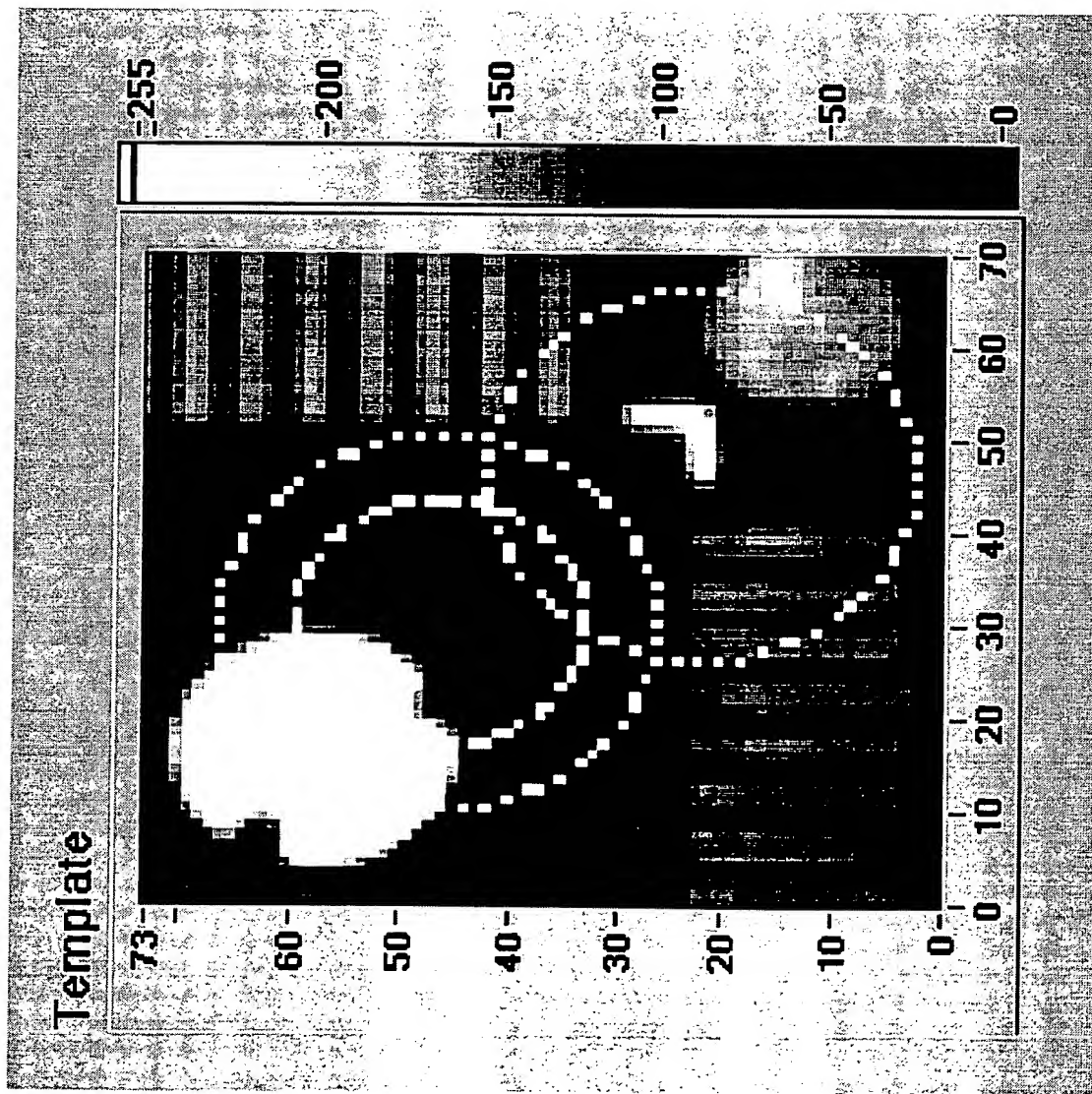


FIG. 22

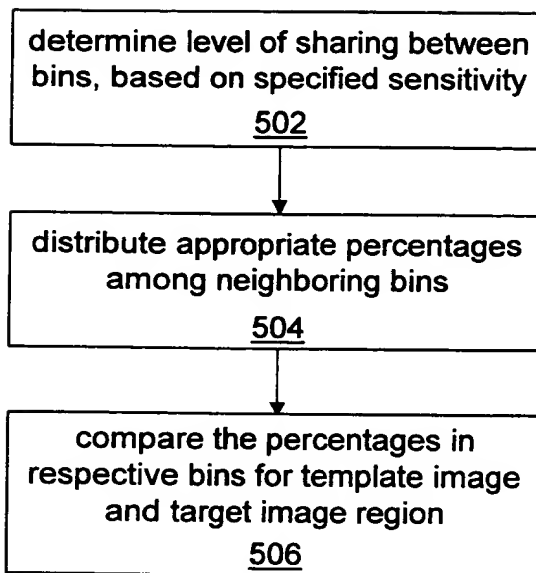


Figure 23

004780" T28E960

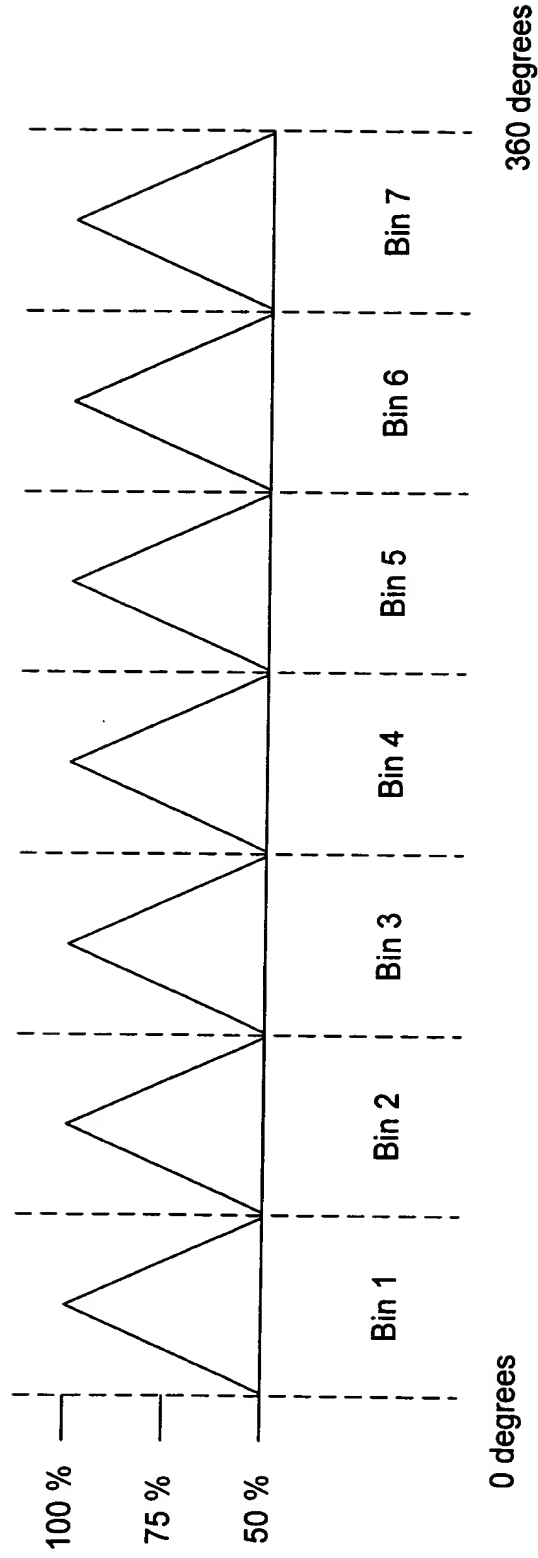


Figure 24

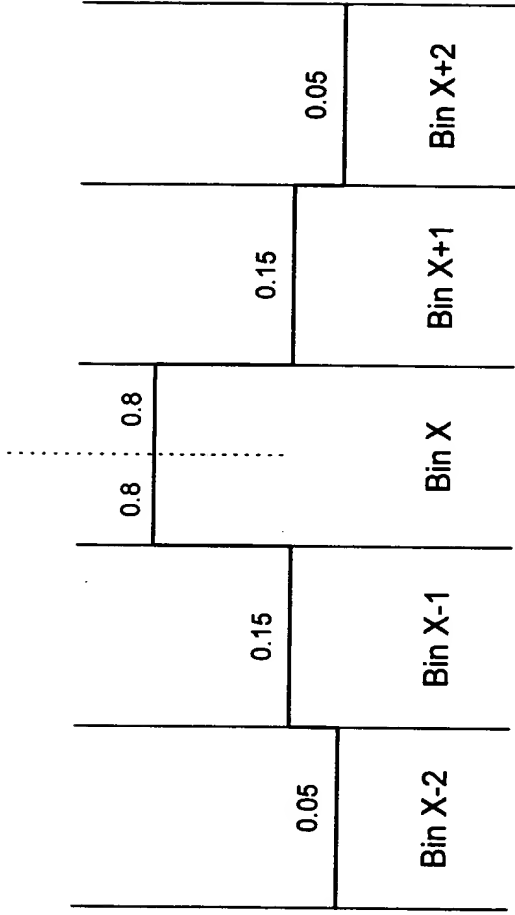


Figure 25

Color Location

Learn Parameters

Image Type
HSL

Learn Mode
Shift Information

Ignore Black and White
Disabled

Feature Mode
Color

Color Sensitivity
Low Sensitivity

Learn Time(ms)
6

Learning ...

Search Parameters

Search Strategy
Conservative

Number Matches Expected
4

Number of Matches
4

Match Mode
Shift Invariant

Minimum Match Score
700.00

Search Time(ms)
15

Matching ...

Matches

Position

x
182.00

y
183.00

Angle
0.00

Scale
1.00

Score
998.69

Bounding Box

x
157.00

y
176.00

Figure 26

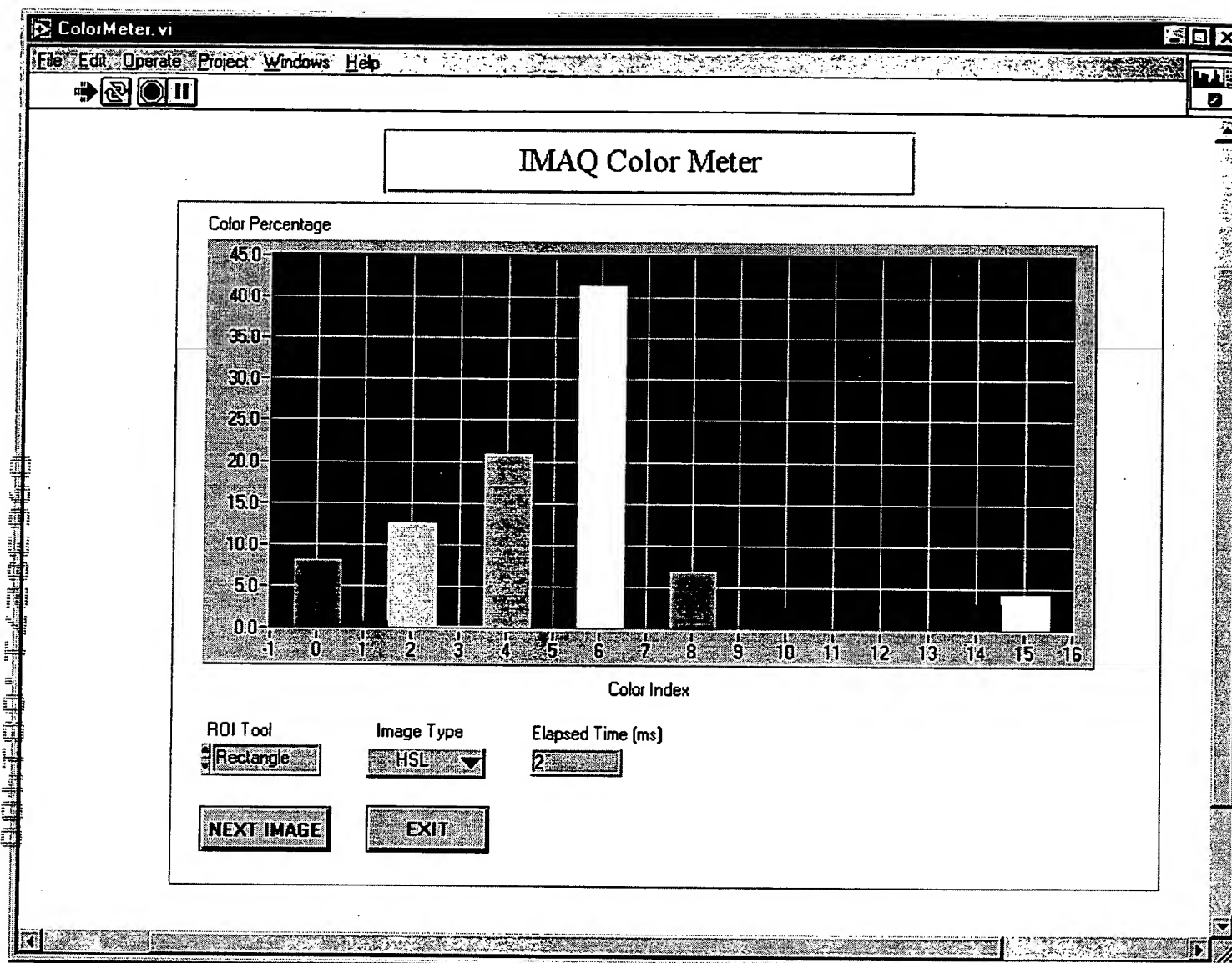


FIG. 27